Server System Infrastructure(SM) (SSI) Organization Overview and Update

May 2010

About SSI(SM)

- Established in 1998, the Server System Infrastructure(SM) (SSI) Forum is a leading server industry group that drives the server infrastructure standards
- For ten years, SSI created standards for redundant server power systems, rack-mount server chassis, power control and management, and other components, and services that simplify the build of server solutions
- In recent years SSI has extended it's standardization to add blade-based server standards to address customer and ecosystem challenges.
- SSI's goal is to enable future server market growth by standardizing interfaces between components, including boards, chassis, and power supplies, and by developing common server hardware elements.

The SSI(SM) Ecosystem

Since 1999, SSI has delivered over 45 Industry specifications to enable more than 125 companies to deliver standards-based systems.

The SSI Forum has been extended in preparation for the next wave of server growth into HPC, Blades, Data centers, virtualized environments, and Cloud Computing

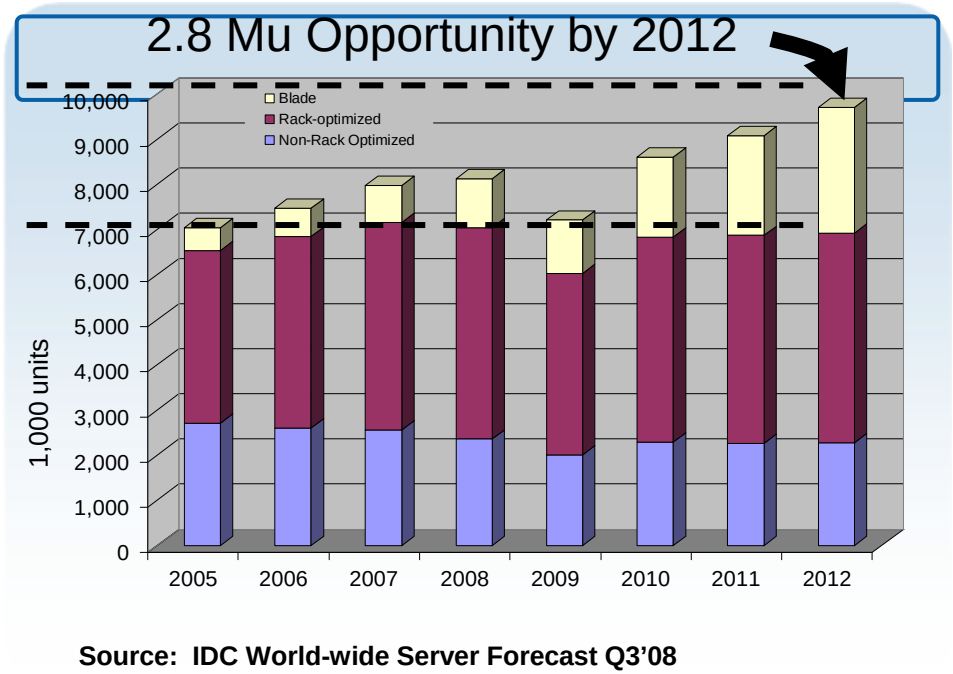
SSI enables massive opportunity for enterprise compute platform development - potential $1B or greater industry savings for the Server Market over next decade

Industry responding to SSI's market opportunity with more than 40 members engaged and more joining weekly

Topics Covered in This Overview

- Server Blade Opportunity
- Updates on SSI(SM) activities
  - Specifications
  - EcoSystem
  - Organization
  - Compliance & Interoperability Lab
  - Demos and reference systems
- SSI future activities and plans

Strong Growth For Blades Through 2012



Source: IDC World-wide Server Forecast Q3'08

- Blades represent 2.8Mu opportunity (was 3Mu pre-crash) in 2012, with strong >20% CAGR from 2007-2012
- IDC still predicting Blades 26% of Server market in 2012

Blade Servers Offer:

Density

Efficient Management

Power and Cooling Advantages

Serviceability

Blades ARE Solving IT Issues!

Blades Emerging as Best-in-class Solution for Enterprise and Small & Medium Business
But High R&D and Ecosystem barriers exist today

SSI(SM): Changing Blades Development

Today's Model - Can Anyone Afford It?

OEM Development:

Innovation / Integration
Time and Dollars $ Limited

Compute Blade	Mezz Card	Switch / IO EcoSystem	Chassis Mgmt Module (HW & SW)	Chassis
$$	$	$$$	$$$	$

High Blade Development Costs Due to Need to Develop All Basic Building Blocks → Little Time / Dollars For Innovation

Future with SSI(SM): Leverage Ecosystem for Differentiation not Re-invention

OEM Development:

Innovation / Integration

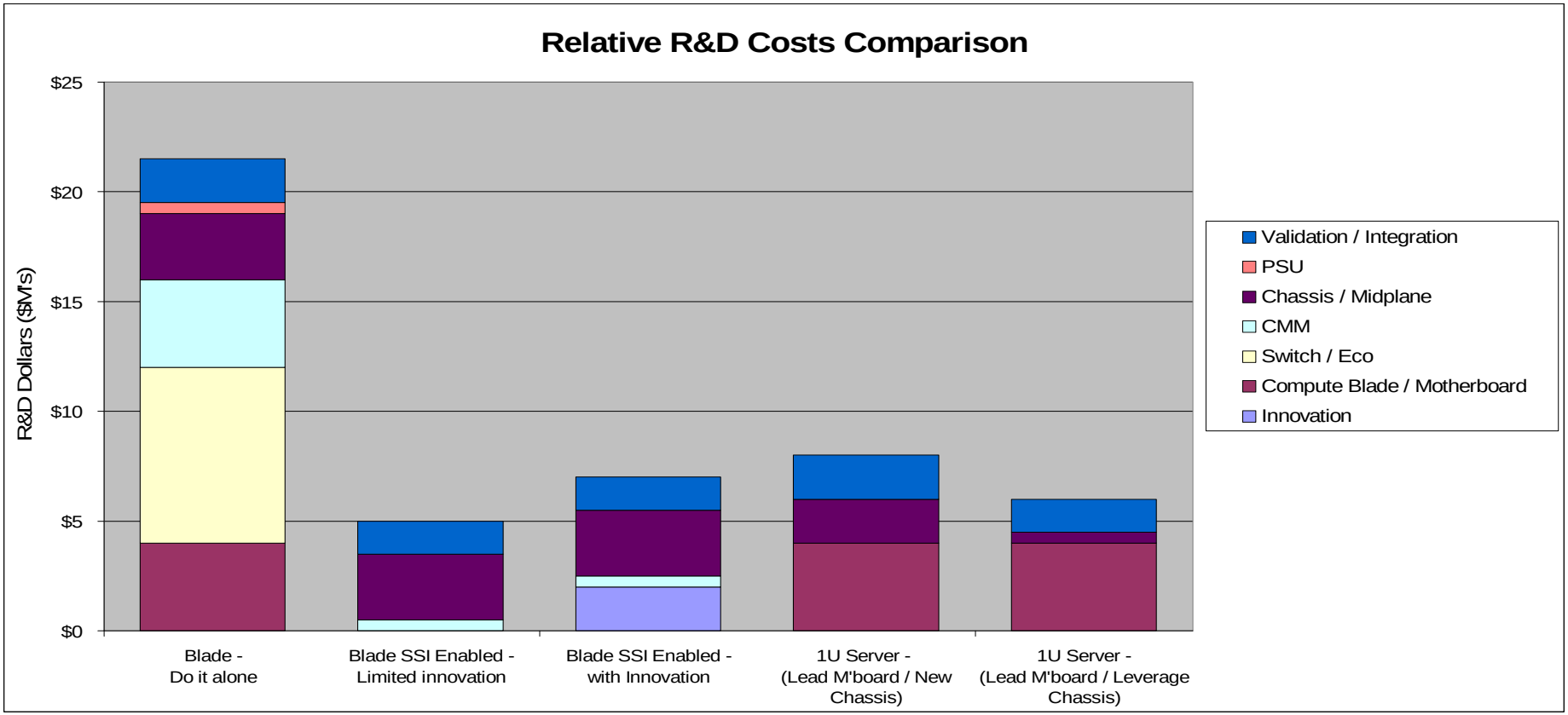
Majority of Investment $$$$

EcoSystem Development:

Compute Blade	Mezz Card	Switch / IO EcoSystem	Chassis Mgmt Module (HW & SW)	Chassis
$	$	$	$	$

Standardized of Basic Building Blocks Allow Partners to Spend Time on Innovating / Integrating

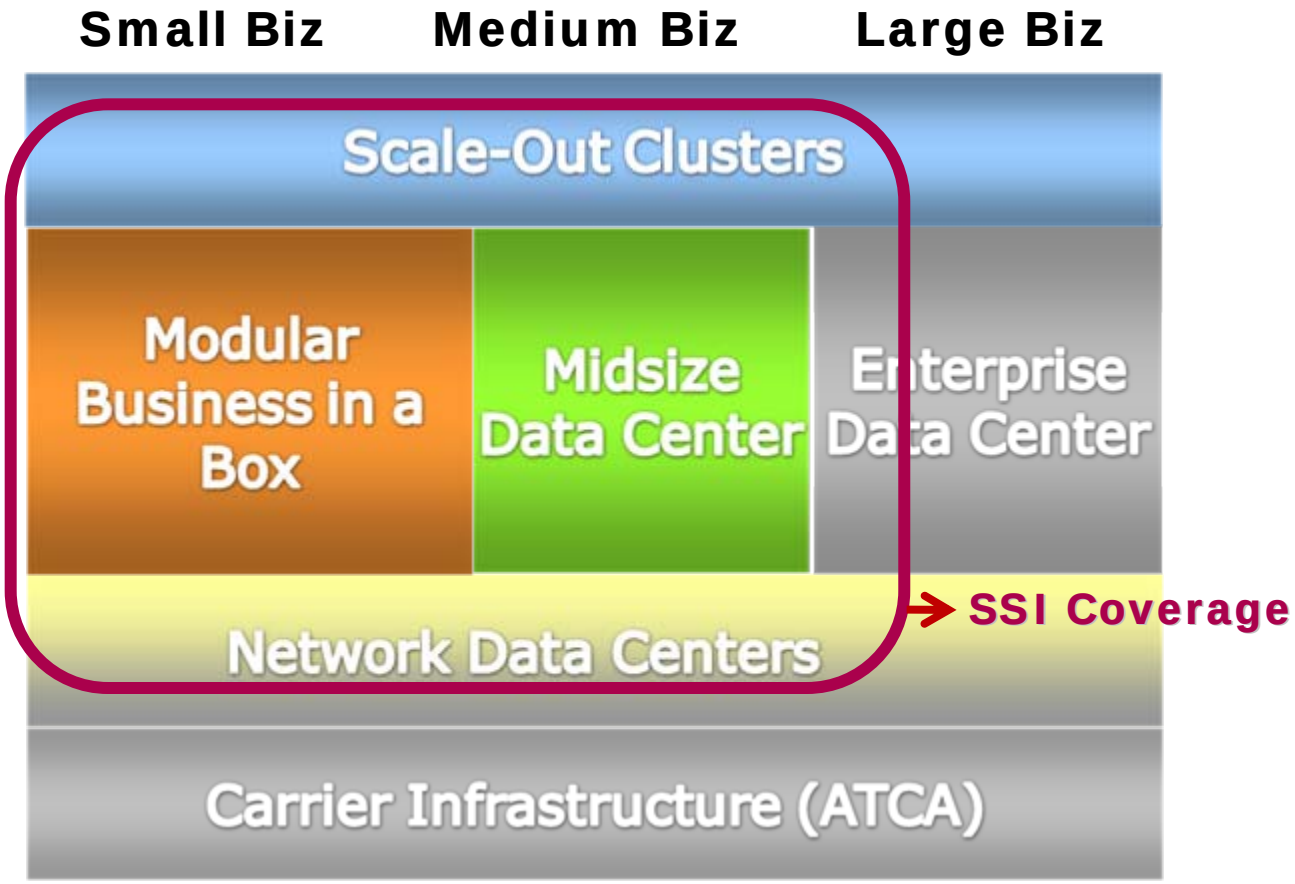
Blades Relative R&D Cost Comparison



- **Drastically Reduced R&D costs for SSI(SM) blades system by leveraging Ecosystem**
- **Costs in line with standard 1U Motherboard/chassis**

Channel Opportunity

Focus of Modular Server Specification



New Blade Opportunities in Untapped Market Segments

SSI SERVER SYSTEM INFRASTRUCTURE FORUM *Managing Component Interfaces*

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  - Specifications
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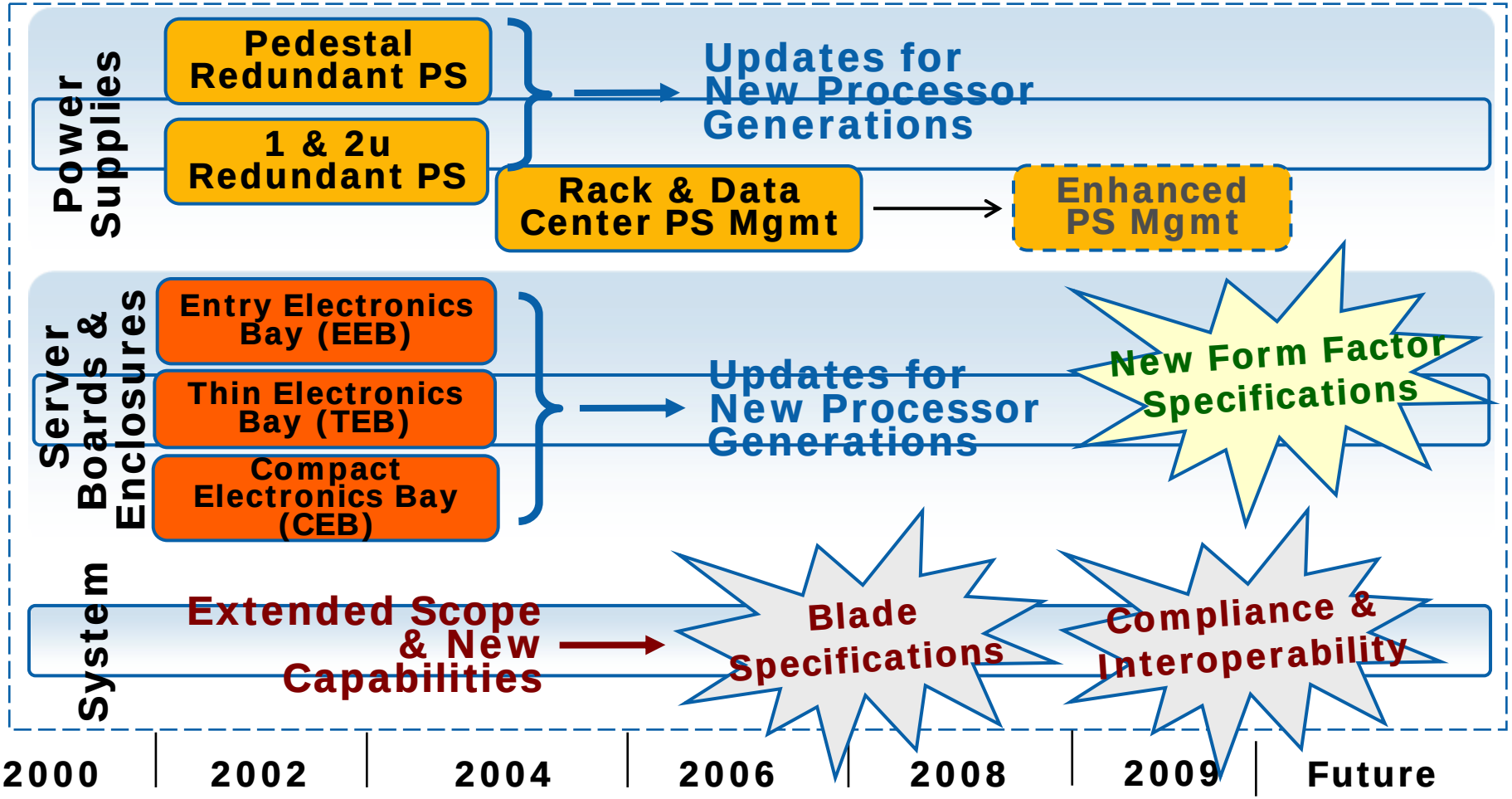
SSI(SM) Roadmap

Server System Infrastructure (SSI℠)



Harnesses continued innovation across all focus areas

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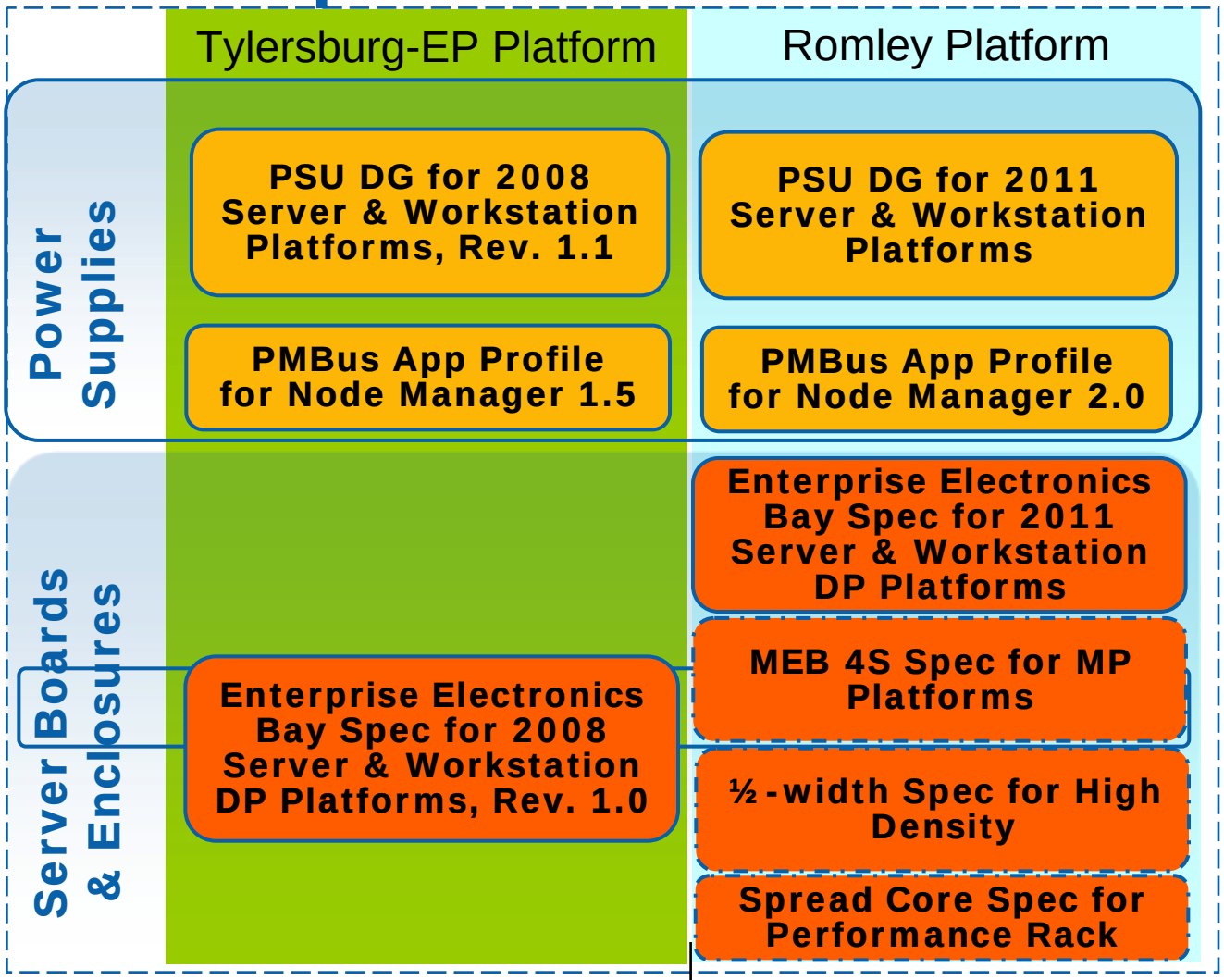
SSI(SM) Power Supply & Electronic Bay Roadmap



Status

- Rev 0.3 (Update)
- Rev 0.3 (Update)
- Rev 1.0 (Released)
- Rev 0.3 (Concept)
- Rev 0.3 (Concept)
- Rev 0.3 (Concept)

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SSI(SM) Specifications

- **A set of design specifications to enable development and integration of modular, bladed platforms**
- **Design specifications* include:**

- Compute Module Specification	Promoted to Revision 1.0*
- Mezzanine Card Specification	Promoted to Revision 1.0*
- Chassis Management Module (HW)	Promoted to Revision 1.0*
- Base Specification, Switch Module	Promoted to Revision 1.0*
- Midplane Design Guide	Promoted to Revision 1.0*
- Midplane Electrical Specification	Promoted to Revision 1.0*
- System Management Design Guide	Promoted to Revision 1.0*

Specifications available to SSI Adopters at
http://www.ssiforum.org

* Note: See SSI WEB site for latest Revisions

Enabling broad industry participation in blade market

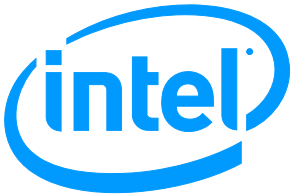
Oct 2008 Announcement with IBM

- IBM Opens Switch Specifications to SSI(SM)
- Leverages IBM BladeCenter Leadership
- Over 25 Switches Available
- Joint SSI Switch Compliance Lab

Open Switch Ecosystem For Bladed Server Designs

SSI(SM) Membership 40* *today…and growing*

Sponsors



Contributors

Adopters

*Not all companies allow SSI to use their logos

SSI(SM) Update

- Announced Product Development Kits (PDKs) Compliance Test Kits announced at SC09 (Nov 2009)
  - PDK for interoperability
  - A family of Test Kits for compliance testing
  - A Blade Management Test Suite to help with blade development on Intel Architecture
  - 3rd party compliance and interoperability (C&I) test facility is fully functional at UNH-Interoperability Lab
- Demos delivered at Spring IDF Beijing (April 2010)
  - Live demonstrations
    - Full OEM Developed SSI System
    - First Ethernet switched developed for SSI to IBM BladeCenter switch was demonstrated
  - Displays of SSI-compliant components
- Liaison agreement with China's High-Performance Computing Standards Committee (HPCSC) signed
  - Formalizes a reliance on SSI specs and C&I programs by HPCSC

SSI(SM) Organization: Membership Tiers and Benefits

Adopters
$2,500*

- Listed as Adopter on SSI Website with Member access
- View draft specs
- Access to C&I testing and test tools at standard rates
- Participate in training seminars and interoperability plugfests
- Added to Integrators List on SSI website after successful participation in plugfest
- Given free copyright license and IP rights to Final Specifications

Contributors
$10,000*

Same as above, plus …
- Listed as Contributor on SSI website
- Discount on C&I testing and test tools
- Right to participate in Working Groups with voting rights
- Able to review and comment on draft specifications
- Can attend and participate in Alpha compliance workshops

Sponsors
$25,000*

Same as above, plus …
- Listed as Sponsor on SSI web site and in press materials
- Eligible for Board of Directors and to chair a Work Group
- Right to approve SSI draft specifications
- Right of first refusal for all marketing and promotion activities

* Annual Fees (New Members assessed a one time $5K initiation fee)

Join at www.ssiforum.org *NOW*!

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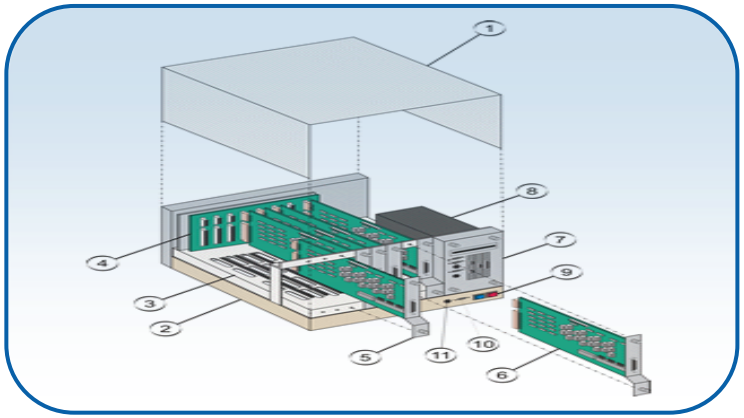
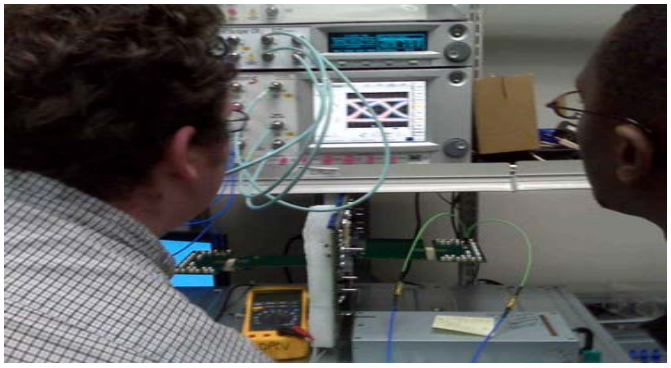
Current SSI(SM) Work Groups



Systems Architecture (SAWG)



Compliance and Interoperability (CIWG)

Server (SWG)

Marketing (MWG)

Addressing Spec Creation to Product Creation

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SSI(SM) Work Groups

Server Work Group

- Develop specifications and other collateral to support Rack and Pedestal Server and Workstations.
- Develop and maintain specifications governing the motherboard/chassis form factors (also known as Electronics Bay) and the power supply form factors for a variety of market segments.
- Develop other specifications and collateral as needed to ensure a robust ecosystem of component suppliers to serve channels market.

System Architecture Work Group

- Develop process to post specs for review and comment
- Collectively decide which comments to include in final specification versions
- Vote on specs when ready for approval and forward to SSI Board for formal approval

Marketing Work Group

- Implement logo program and/or integrator list
- Develop all messaging
- Decide which events to use for demonstrations and/or speaking engagements
- Manage all informative website materials and oversee press and analyst relations
- Commission white papers, case studies and any other collateral
- Promote SSI Membership

Compliance and Interoperability Work Group (CIWG)

- Develop integrators list criteria
- Conduct compliance workshops and plugfests
- Manage compliance testing activities

Inquire about participation at www.ssiforum.org

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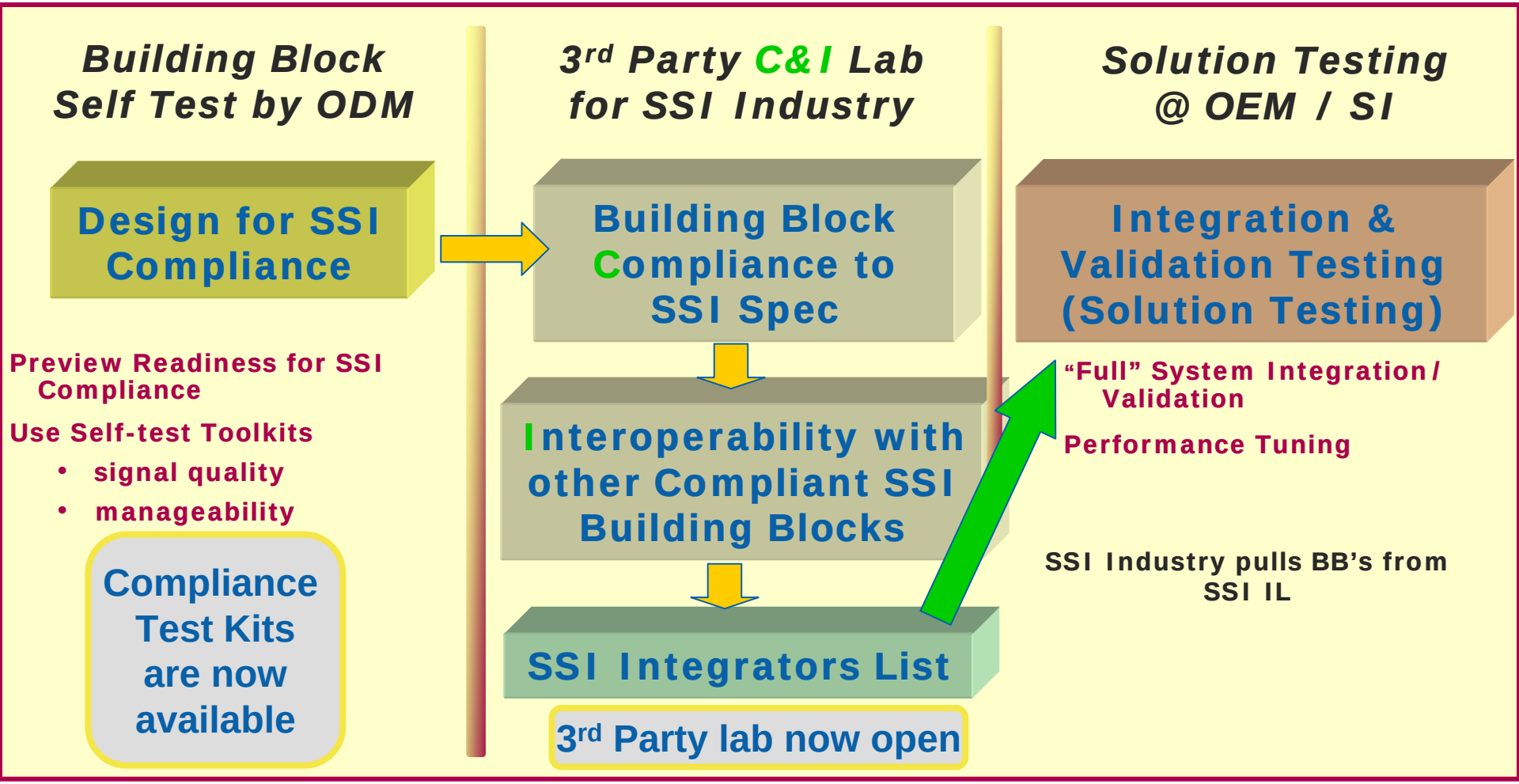
SSI Building Blocks:
Path from Design to Full OEM System Integration



Result → Total System Validation Time Cut by up to 50%

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Compliance & Interoperability
Design for Compliance

Arch Specs*

Describes

Design Criteria "rules"

***Compute Blade, Mezzanine, Switch, Management**

C&I Test Specs

Interpret

- **Assertion List**
- **Design Checklists**

Define

Test Criteria

- **Test Definitions**
  - **Manual Procedures**
  - **Tool Design Specs**

Testing Procedures/Tools

Validates

Test Criteria

- **Compliance checks**
- **Base Level Interop.**

Clear Test Output

Maps

Directly to Test Spec

Q1 | Q2 | H2

Leveraging Best Methods from PCIe, USB… Predictable Verification Path

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SSI(SM) PDKs and Test Kits

➢ SSI Product Development Kit (PDK) :

- **"Oaks Bay" :**
  - 1 Intel Victor Island Compute Blade
  - 1 AMI Chassis Management Module
  - 1 Gigabit Ethernet Low Speed Switch ("Pilot Rock" - concept/test switch)

➢ SSI Compliance Test Kits:

- **SSI-ITK (Integrator Test Kit):**
  - Chassis with Power-supply & fans
  - C&I Mid-plane (routed to boundary of SSI Mid-plane Des. Guidelines)
    - 2 low speed switch connectors (VHDM)
    - 2 single-high high speed switch connectors (GBX) (or "bay-room" for 1 double high)
    - 3 compute blades connectors
    - 3 Mezzanine connectors
    - 2 Chassis Manager Connectors
    - Note: SSI-ITK does not include actual blades, mezzanine, switch or CMM
- **SSI Module Compliance Test Kits: (Note: requires additional SSI-ITK)**
  - SSI-BTK : Blade/mezzanine Signal-Quality Test Kit
  - SSI-STK : Switch Signal-Quality Test Kit
  - SSI-MPTK : Mid-plane Signal-Quality Test Kit
  - SSI-SMTK : System Management Test Kit (Blades/Mezzanine and Switch)

➢ Intel "Value-add" Test Kits

- **Value-add for IA Blades : BMTS (Blade Management Test Suite)**
  - Functional Unit Test for Blade Management per Chapters 6&7 of the SSI Blades Base Specification
  - Includes a test board which allows the Blade to be tested for Mgmt. outside of the Chassis

Email Requests to : PDK@ssiforum.org

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www.ssiforum.org

"Which Tool-kits Should I Choose?" …

All Module Developers : Choose Oaks Bay as a system reference tool for Interoperability

Blades Module Developers

- SSI-BTK plus SSI-ITK for blade signal quality compliance
- SSI-SMTK for Blades manageability compliance
- BMTS for increased coverage of management features of your IA based SSI blades
  - Value-add for IA Blades

Switch Module Developers

- SSI-STK plus SSI-ITK for switch signal quality compliance
- SSI-SMTK for switch manageability compliance

Mezzanine Module Developers

- SSI-BTK plus SSI-ITK for Mezzanine signal quality compliance
- SSI-SMTK for Mezzanine management compliance

CMM Module Developers

- SMTK may be useful as basis for comparison as you develop your CMM

System Integrators

- SSI-MPTK for mid-plane signal quality compliance
- SSI-ITK as useful tool for sig-qual compliance comparison of your mid-plane
- Include ea. SSI-BTK, SSI-STK, SSI-SMTK, BMTS as needed to cover your Modules
- Oaks Bay PDK will be useful as basis for comparison as you perform integration

Note: The "SSI Compliance Test Kits" are the Compliance metric for SSI. The "Oaks Bay" PDK is a valuable tool for measuring interoperability of your modules during development. The Oaks Bay PDK is one of the systems used to measure Interoperability in the SSI C&I Test Lab. The SSI Compliance Test Kits and the Oaks Bay PDK will be available for use in the SSI C&I Test Lab in Q1'10.

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SSI(SM) Future Plans and Activities

- Hold the first Compliance and Interoperability event at a third-party test house
- Complete the review process for the PSU DG for 2011 and the PMBus App Profile for Node Manager 2.0
- Develop specs for new server form factors: half-wide, 4-socket and spread core
- Continue to display SSI products as proof points at major trade shows through 2010 and beyond
- Develop the liaison between SSI and the HPCSC organization in China, leading to the development of HPC components based on SSI specs

Summary

- **Blades are fastest growing server market segment**
  - But Vendor's face high cost of entry today
- **SSI(SM) defining set of open blade specifications**
  - Investment protection for future - 3 generations headroom
  - Focused on the blade needs of SMB Market
- **SSI building open EcoSystem for Blade System basic Building Blocks**
  - Faster TTM
  - Allowing Development $$ to be spent on innovation
  - Room for OEM differentiation
- **Restructured SSI organization with three levels of participation**
  - Adopter, Contributor, Sponsor
- **SMB Market expanding – potential growth area for Blades**

Join SSI Today – Ecosystem is forming!

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For More Info

- **Visit *www.ssiforum.org* to learn more about**
  - SSI(SM) organization
  - Current status or download of all specifications
  - Benefits of joining SSI at different membership levels
  - Demos and trade show activities
  - Companies participating in SSI
- ***Compute, Mezzanine, Chassis Management Module, and Switch Specifications available for Design starts***
- ***Participate in Server, System Architecture, C&I, Marketing Work Groups***
- **Contact Information:**
  - jim.ryan@intel.com

Thank You!